Saskatchewan Agriculture, Food and Rural Revitalization

FARM *FACTS*

Managing Livestock Mortalities

INTRODUCTION

Death of animals is a normal occurrence and represents a loss to the operator. Even the best livestock producers will have losses between two and three per cent, but higher rates can occur. There are several options for managing livestock mortalities.

CAUSE OF DEATH

The death of an animal may be an indication of a problem area that needs prompt attention. Cause of death may include disease, predation, poor nutrition or accidents. Analyze the cause of death and identify measures to minimize further losses.

Confirm that feed is providing sufficient nutrition by consulting a private livestick agrologist. If poor feed is contributing to death loss, the agrologist will help improve the feeding regime for fewer deaths and improved herd performance. The Saskatchewan Institute of Agrologists will know of local agrologists, and contact information is available in Appendix A.

Contact a veterinarian if the death rate increases noticeably. The veterinarian will help identify the cause of death and prepare a suitable treatment program if appropriate. Identify the source of infection if the animal died from a transmissible disease. Review bio-security measures, as animals from other herds or barns may carry disease. Rodents, insects and birds may also carry disease.

Verify the cause of death with laboratory analysis. Deliver the animal carcass or tissue samples to an appropriate laboratory. The laboratory will notify the Canadian Food Inspection Agency's (CFIA) District Veterinarian if the cause of death is a reportable disease. A list of reportable diseases (accurate in September 2004) appears in Appendix B. To obtain a current list, contact the CFIA District Veterinarian (Appendix C).

If the mortality is a bovine that fits the BSE surviellance requirements (greater than 30 months of age), submit a sample to CFIA's Bovine Spongiform Encephalopathy (BSE) surveillance team (Appendix D).

RENDERING

Rendering is the preferred method of managing mortalities. In fact, value added products are produced from the redering process. Also, the high temperature (about 130°C or 265°F) will destroy most pathogens if any are present. The process temperature, length of retention time and sensitivity of the pathogen affect survival. Evaluate animals that died under suspicious conditions to determine if rendering is an appropriate disposal option (some diseases may not be destroyed by rendering).

Rendering may not be an option for some producers depending on location, type and volume of mortalities. Call the rendering processor to determine if rendering is a viable option. Carcasses must be in good condition, and storage of the carcass and timing of delivery to the rendering processor is important. Contact information is in Appendix A.

In the winter, store animals to prevent access by scavengers prior to pickup. An un-insulated building is ideal for storage, but a fence or bale enclosure also works. In the summer, cold storage will generally be required to hold the carcass before pickup.

Bio-security is an important consideration: be aware that the rendering vehicle usually stops at several farms on its route. Select a pickup location that is separate from healthy livestock, convenient for both the driver and producer, and screened from public view. Bins may be available from the rendering company to allow the carcass to be loaded easily. Otherwise, equipment such as a front-end loader must be made available.

Fenced enclosure

INCINERATION

Incineration is an acceptable method of disposal if performed properly. Incinerators are more often associated with poultry and swine, but larger animals may also be incinerated. The capital cost may be prohibitive to some producers, but many operations may find incineration a convenient and economic option. Remember to estimate the cost of energy and fuel when comparing incineration to other disposal options.

Incinerators are regulated by Saskatchewan Environment, and a permit may be required to operate an incinerator. Information that may help to obtain a permit under *The Clean Air Regulations* is listed in Appendix E. Contact Saskatchewan Environment for further information. Contact information is available in Appendix A.

Air curtain incinerator

Fuel type is a consideration. Natural gas is suitable but may not be available in some areas. Diesel will burn hotter than natural gas, and is an option where natural gas is not available. Some incinerators burn propane and others burn wood. For example, air curtain incinerators burn wood and will eliminate many carcasses very quickly.

Some incinerators require a source of electrical power (usually 220V). Locate the incinerator near an electrical source, or install power at the incinerator location. Although less convenient, a generator is an option in the absence of power lines.

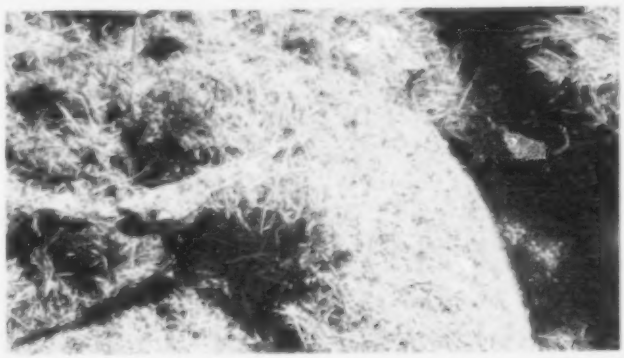
Size the incinerator to handle the largest expected carcass. The incinerator will not operate properly if the incinerator is overfilled because airspace is required around the carcass to achieve a proper burn. If the incinerator is too small, the carcass must be reduced to an appropriate size. Consult the incinerator supplier to select a unit that meets the operation's requirements.

Maintain the operating temperature between 760° and 1090° C (1400° and 2000° F) to limit emissions and achieve thorough and complete incineration, including bones. Following incineration, some bones may appear intact but will crumble easily. The incinerator should have a secondary chamber to ensure complete combustion.

Neighbours will not notice incineration if it is operating properly. Regardless, be aware of wind conditions and the location of neighbours when operating the incinerator. Strong winds help to reduce the travel distance of odour, whereas calm conditions (often dusk or dawn) help odour to travel further distances.

COMPOSTING

Although composting is commonly associated with small animals like poultry, large animals like cattle will compost under proper conditions. Control the composting process carefully to promote proper decomposition. Burying a carcass in a pile of straw to rot is not considered composting.



Insufficient cover material

Two common "on-farm" composting systems are bins and windrows. "In-vessel" composters are also available and may be suitable for some operations. "In-vessel" systems are usually produced commercially, and reduce the composting time with active aeration and heat.

The bin system requires at least three bins. One bin is filled with carcasses and a "bulking agent" (straw, sawdust, etc.) and then left to compost while a second bin is filled with carcasses and a bulking agent. When the second bin is full, the carcasses are moved from the first bin to a third bin for further decomposition.

Rotating "in-vessel" composter

Windrow composting is an outdoor system often used to compost manure. The carcasses are layered and covered with a bulking agent to form a pile roughly triangular in cross section. The windrow grows longer as more carcasses are added, and eventually the windrow will be turned to encourage further decomposition.

Compost production requires careful management. Moisture content, temperature and "carbon-to-nitrogen ratio" are important variables. Monitor the process to maintain these variables within an acceptable range. Composting time ranges from six to 18 months, depending on a number of variables: management, size of carcasses, climate and compost pile design. The finished compost product is a stable source of nutrients and is generally weed and pathogen free.

The capital cost of composting includes constructing or adapting existing structures, and grading or earthwork to prevent runoff. Bins could be roofed for control of moisture content. Access to water is important to control moisture content, and access to equipment is required to move animals and compost.

Consider the proximity of surface water, groundwater and neighbours when locating the compost facility. The site should be convenient, accessible in winter and screened from view. Cover the mortalities with sufficient bulking agent to prevent access by scavengers and reduce odour.

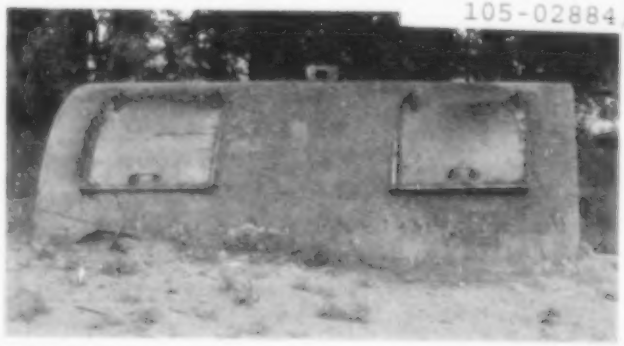
For further information, refer to Saskatchewan Agriculture, Food and Rural Revitalization's (SAFRR) publication titled *Composting Animal Mortalities: A Producer's Guide*.

BURIAL OF NORMALLY OCCURRING MORTALITIES

Burial of mortalities is a common and appropriate method of disposal if managed properly. The carcass is disposed of quickly, and potential nuisance is eliminated.

Locate the burial pit in clay or till soils. Fortunately, much of Saskatchewan is underlain by till material that extends to a significant depth beneath the surface. Dig test holes to a depth of about 4 m (13 ft.) with a backhoe and wait 24 hours. If water appears in the test hole, choose an alternate location for a burial pit. Avoid locations with sand and gravel. The burial pit and pit area should not be subject to flooding.

Consider the depth to a useable water source. Maintain at least 2 to 4 m (6 to 13 ft.) between the bottom of the burial pit and a useable groundwater water source, depending on site conditions. A good description of subsurface conditions may be available from records of nearby wells. The Saskatchewan Watershed Authority has a record of wells and known aquifer locations. Contact information is in Appendix A.



Burial pit cover

Winter burial is a challenge. However, burial pits may be prepared in the fall and a final cover placed in the spring. Estimate the winter death loss (Appendix F) and allow 1.5 m^3 (2 cu. yd.) of burial pit volume per 450 kg or 1000 lb. of carcass. A lid will protect mortalities from scavengers and prevent snow from filling the pit. The location must be accessible by equipment during winter conditions.

Alternatively, the carcass may be stored until spring at a site that is inaccessible to scavengers. A sheltered building, metal bin or a round bale enclosure with chain link provides good protection.

Burial Pit Management

Puncture the abdominal cavity of large ruminants to prevent bloating. Be careful to avoid contact with abdominal material.

Cover the animals as soon as possible. As the burial pit fills, cover each layer of carcasses with at least 0.3 m (1 ft.) of soil. In the winter, 0.6 m (2 ft.) of straw is an acceptable interim cover.

Maintain at least 1 m (3 ft.) between the top surface of the carcasses and the natural ground surface. Mound the final soil cover about 1 m (3 ft.) above the surrounding terrain to ensure that water doesn't pond above the burial pit.

Maintenance of the area around the disposal site may be required for several years until decomposition of the animals has occurred and the soil has finished settling. Fence the site if necessary. Unless the pit is in a cultivated field, seed the top of the burial pit to grass or other vegetative cover to prevent erosion and weed growth.

For assistance in locating a site for disposal of mortalities from your livestock or poultry facility, contact the SAFRR Agricultural Operations Regional Specialist for your area (Appendix G).

CATASTROPHIC MORTALITIES

Producers should develop a plan in the event that they suffer a catastrophic event which results in a large number of deaths. This includes events such as fire, flood, building collapse, suffocation or the outbreak of a major disease.

If the death of the animals is a result of a federally reportable disease (Appendix B), the CFIA is the authority responsible for directing the disposal of mortalities. The CFIA will assist in advising on the safe disposal of carcasses.

If a large number of animals or poultry die due to a non-listed infectious disease, a fire, flood or another natural disaster, the appropriate municipal authorities and various provincial government departments will direct disposal of the mortalities.

If disposal sites are pre-selected and approved, carcass disposal can begin immediately. In some cases where a highly infectious disease is involved, it is desirable and important to dispose of the carcasses quickly to contain the disease and prevent its spread to neighbouring farms. Rapid disposal of the carcasses is also important in hot weather as carcasses start to decompose very quickly and can become a nuisance.

On-site disposal is the preferred option for a catastrophic death loss.

Site Selection for Mass Burial

The selection of a carcass disposal site requires some knowledge of the environmental conditions at the proposed site. Factors such as the topography, depth to useable groundwater, soil type and depth, distance to neighbours and the location of roads are important. A good site will have natural features that protect the environment and minimize future maintenance.

Consider the livestock producer's own land as the first site (particularly land close to the facility) to minimize transportation, allow for timely disposal and control spread of disease.

If the producer has obtained an approval under *The Agricultural Operations Act*, the test hole logs provide excellent information about the soil type and depth at the site and may provide information on depth to water sources in the area. Well logs which are available from the Saskatchewan Watershed Authority are another excellent source of information on the type of sub-surface soils and groundwater potentially in the area. Contact information is in Appendix A.

Locate the burial pit in an area not subject to flooding. The livestock producer must be aware of any underground utilities located at or near the selected burial site. The site must be accessible by wheeled vehicles. Give consideration to location of neighbours and the prevailing winds in the area. If possible, the site should be screened from public view.

Maintain 100 m (325 ft.) from a watercourse, body of water, source of domestic water, residence, other livestock facilities, property boundaries, primary highways, secondary highways and municipal roads.

If the selected site is not adjacent to the livestock/poultry facility, then determine a route from the facility to the burial pit. Attempt to minimize the travel distance and avoid neighbouring livestock. Choose an all-weather road so access can be achieved regardless of the weather.

Discuss site selection criteria and location with local municipal officials. There may be municipal bylaw requirements.

Land Requirement

As a rule of thumb, allow 1.5 m^3 (2 cu. yd.) of burial pit volume per 450 kg or 1000 lb. of carcass. Refer to Appendix F for typical carcass weights.

If a producer needed to bury 2,200 cows and planned to use a pit 2 m (6.5 ft.) wide and 3 m (10 ft.) deep (2 m of useable depth) the pit would be about 1000 m (3300 ft.) long. The surface area of this pit would be 2,000 m^2 or ½ ac. A pit this size would handle approximately 12,100 feeder hogs.

The configuration of the pit is dependent on the equipment used to dig and deposit the animals, soil conditions and volume of material to be buried. In the above example, 10 trenches 100 m (325 ft.) long spaced 6 m (20 ft.) apart may be a suitable configuration. Allow sufficient space between the trenches for the spoil and movement of equipment.

A long narrow trench with steep sides allows animals to be dumped out the back of a truck and minimizes the need to move animal carcasses around in the burial pit to achieve an even burial depth.

If the death losses are the result of an infectious disease, it may be necessary to dispose of manure, bedding, feed and milk in the burial pit. Additional space will be required.

REGULATIONS

There may be requirements for carcass disposal under the following legislation. Contact the appropriate authority for further information.

Saskatchewan Health
The Health Hazard Regulations

- Section 14 Subject to *The Wildlife Regulations, 1981*, when an animal dies or is unintentionally killed, the owner or the person in possession of the animal shall cause the carcass to be removed and buried or disposed of to the satisfaction of the local authority.

Saskatchewan Environment
The Environmental Management and Protection Act, 2002

- Section 4 No person shall discharge or allow the discharge of a substance into the environment in an amount, concentration or level or at a rate of release that may cause or is causing an adverse effect unless otherwise expressly authorized...

The Clean Air Act

- An incinerator for burning carcasses may require a permit.

Saskatchewan Agriculture, Food and Rural Revitalization
The Agricultural Operations Act

- Section 19(2) No person shall manage the waste from an intensive livestock operation that belongs to a class prescribed as a class of intensive livestock operation for which a waste management plan is required, except in accordance with a waste management plan approved by the minister.

The Agricultural Operations Regulations

- A dead animal management plan is required for certain intensive livestock operations.

Agriculture and Agri-Food Canada
Health of Animals Act

- Section 5(1) A person who owns or has the possession, care or control of an animal shall notify the nearest veterinary inspector of the presence of a reportable disease or toxic substance, or of any fact indicating its presence, in or around the animal, immediately after the person becomes aware of the presence or fact.

GLOSSARY

Anthrax: An infectious bacterial zoonotic disease usually acquired by ingestion of *Bacillus anthracis* or its spores from infected pastures by herbivores or indirectly from infected carcasses by carnivores.

Aquifer: An aquifer will yield sufficient volumes of water for domestic or commercial use. An aquifer is a saturated permeable geologic unit that can transmit significant quantities of water under ordinary hydraulic gradients. Hydraulic conductivities in such formations are typically greater than 10^{-7} m/sec.

Aquitard: Generally restricts or confines the flow of water. An aquitard is a geological formation that does not yield sufficient quantities of water for domestic or commercial use. Hydraulic conductivities are typically less than 10^{-7} m/sec.

BSE: Bovine Spongiform Encephalopathy, commonly known as "mad cow disease".

Till: A mixture of clay, silt, sand, gravel and boulders. Till is typically very good at preventing water movement, because hydraulic conductivities are typically less than 10^{-9} m/sec.

Topography: Natural or physical surface features of a region commonly shown on a map by contour lines.

Zoonotic: Transmissible from animals to man under natural conditions.

APPENDIX A – CONTACTS

1. Saskatchewan Institute of Agrologists:
   Bruce Hobin, Registrar - 242-2606
2. Saskatoon Processing Company:
   934-4887 or 1-800-803-9714
3. Saskatchewan Environment:
   Chris Gray, Environmental Protection - 787-6196
4. Saskatchewan Watershed Authority:
   Brian Hauck, Groundwater Approvals - 694-3944

APPENDIX B – REPORTABLE DISEASES

1. African horse sickness
2. African swine fever
3. anaplasmosis
4. anthrax
5. bluetongue
6. bovine spongiform encephalopathy
7. bovine tuberculosis (M. bovis)
8. brucellosis
9. chronic wasting disease of cervids
10. contagious bovine pleuropneumonia
11. contagious equine metritis
12. cysticercosis
13. equine infectious anaemia
14. equine piroplasmosis (*B. equi and B. caballi*)
15. foot and mouth disease (FMD)
16. fowl typhoid (*Salmonella gallinarum*)
17. highly pathogenic avian influenza
18. hog cholera (classical swine fever)
19. lumpy skin disease
20. Newcastle disease
21. peste des petits ruminants
22. pseudorabies (Aujeszky's disease)
23. pullorum disease (*S. pullorum*)
24. rabies
25. Rift Valley fever
26. rinderpest
27. scrapie
28. sheep and goat pox
29. swine vesicular diease
30. trichinellosis
31. Venezuelan equine encephalomyelitis
32. vesicular stomatitis

APPENDIX C – CFIA DISTRICT VETERINARIANS

Battleford
401 - 27th Street, P.O. Box 1028
Battleford, Saskatchewan, S0M 0E0
Telephone: (306) 937-3633
Facsimile: (306) 937-3338

Moose Jaw
1410B Caribou Street West
Moose Jaw, Saskatchewan, S6H 7S9
Telephone: (306) 691-3450
Facsimile: (306) 691-3455

North Portal
P.O. Box 38
North Portal, Saskatchewan, S0C 1W0
Telephone: (306) 927-2255
Facsimile: (306) 927-2200

Prince Albert
1288 Central Avenue, Room 320
Prince Albert, Saskatchewan, S6V 4V8
Telephone: (306) 953-8614
Facsimile: (306) 953-8801

Regina
3085 Albert Street, Room 300
P.O. Box 8060
Regina, Saskatchewan, S4P 4E3
Telephone: (306) 780-5220
Facsimile: (306) 780-5177

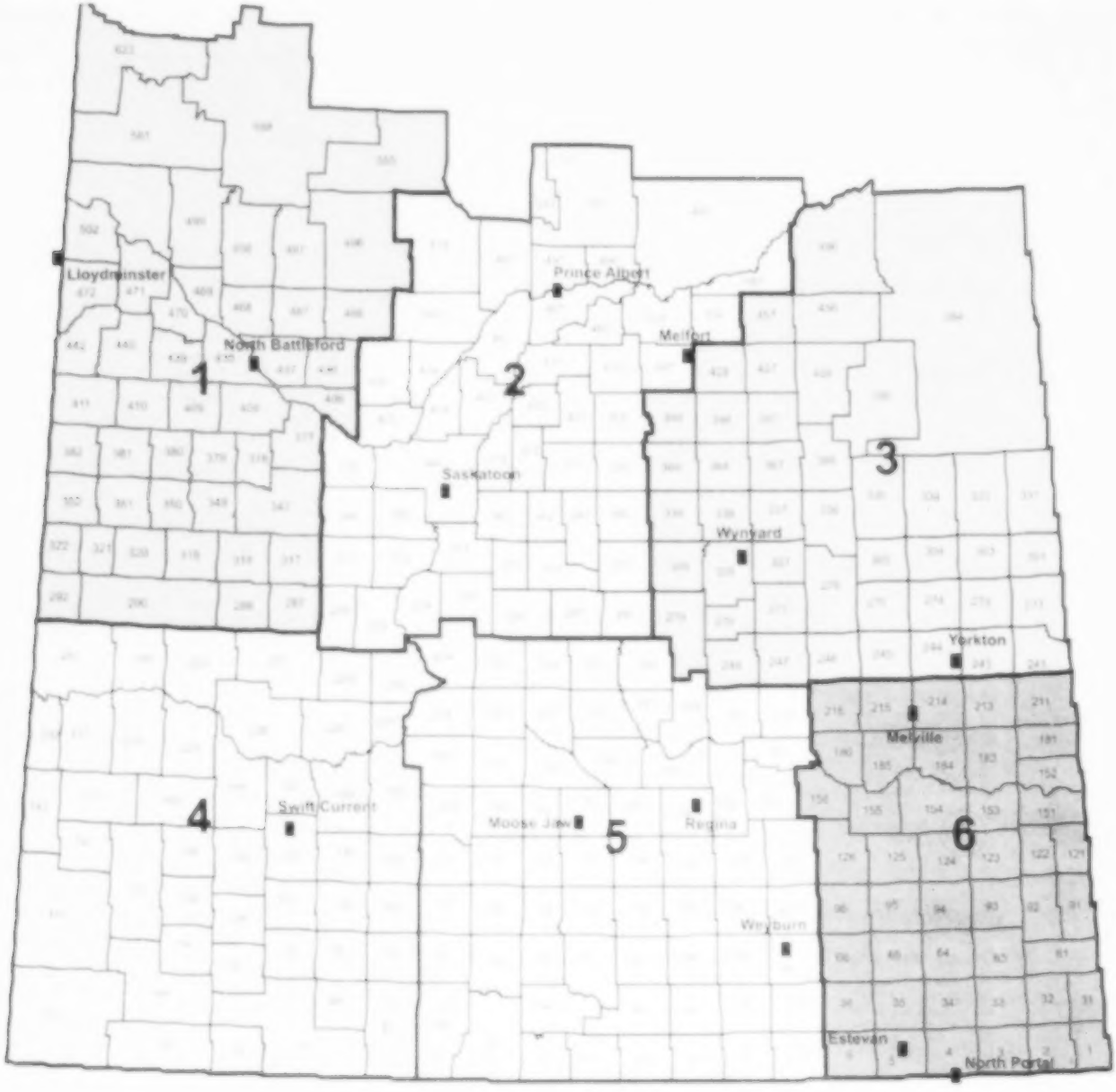
Saskatoon
421 Downey Road, Room 301
Saskatoon, Saskatchewan, S7N 4L8
Telephone: (306) 975-4185
Facsimile: (306) 975-6959

Swift Current
LB Thomson Place
Airport Rd., P.O. Box 1235
Swift Current, Saskatchewan, S9H 3X4
Telephone: (306) 778-5030
Facsimile: (306) 778-5035

Wynyard
325 Bosworth Street, P.O. Box 1719
Wynyard, Saskatchewan, S0A 4T0
Telephone: (306) 554-2202
Facsimile: (306) 554-3212

Yorkton
204 Smith Street East
Yorkton, Saskatchewan, S3N 3S6
Telephone: (306) 786-5300
Facsimile: (306) 786-5310

APPENDIX D – SASKATCHEWAN BSE SURVEILLANCE CFIA CONTACTS



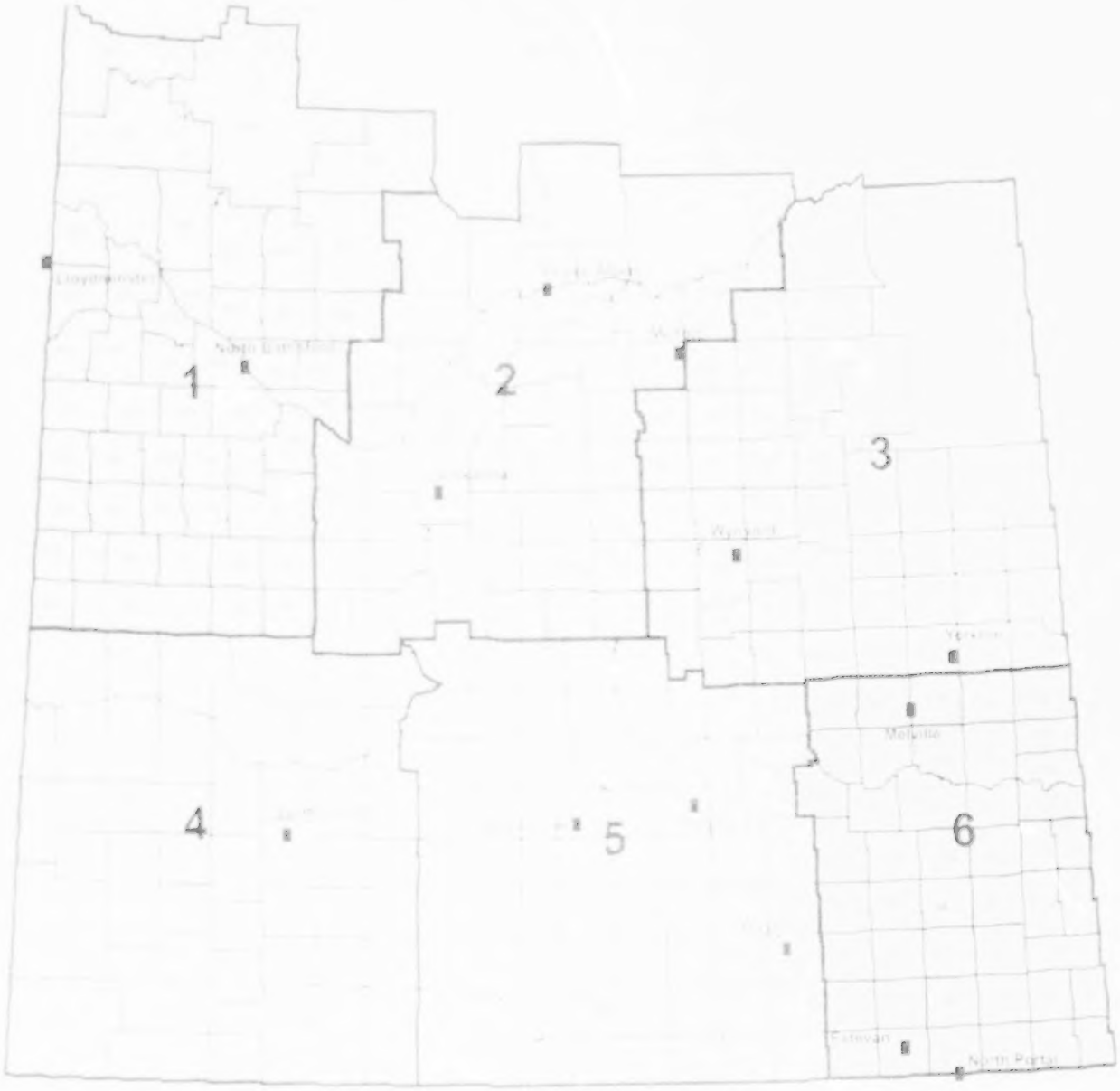
Saskatchewan BSE Surveillance CFIA Contacts:

1	Ron Dewald	Battleford	(306) 937-7274 (o) (306) 441-2010 (cell)	4	Dale Brooks	Swift Current	(306) 778-5330 (o) (306) 741-8262 (cell)
2	Vaughn Smith	Saskatoon	(306) 975-4185 (o) (306) 221-7704 (cell)	5	Nancy Fideau	Moose Jaw	(306) 691-2670 (o) (306) 631-8272 (cell)
3	Ken Anderson	Wynyard	(306) 554-2202 (o) (306) 554-7645 (cell)	6	Mike McDavid	North Portal	(306) 927-2024 (o) (306) 421-0120 (cell)

Toll free: 1-877-SASK-BSE (1-877-727-5273)

Group Leader for Saskatchewan: Dr. Clarence Bischop, Yorkton District Office
(306) 786-5300 (office)
(306) 621-1168 (cell)

APPENDIX D – SASKATCHEWAN BSE SURVEILLANCE CFIA CONTACTS



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Toll free: 1-877-SASK-BSE (1-877-727-5273)

APPENDIX E – INFORMATION FOR AN INCINERATOR PERMIT

(From The Cean Air Regulations)

1. **Map of the area showing:**
   a. topography of the area including land contours
   b. location and description of buildings in the area
   c. property boundaries
   d. land use of area

2. **Information with respect to incinerator installation:**

   a) type of building or process to be served by the incinerator _____

   _____

   b) type and quantity of waste to be incinerated _____

   _____

   c) manner in which incinerator is to be operated _____

   _____

3. **Incinerator Specifications:**

   I a) size_____ b) age _____

   c) capacity _____ d) design efficiency _____

   e) make and model _____

   II Method of charging waste into the incinerator _____

   _____

   III Type and size of grate or hearth _____

   _____

   IV Maximum operating temperature _____

   V Describe provisions made for supplying fresh air for combustion _____

   _____

   VI Retention time of gases in combustion chamber _____

   VII Stack dimensions _____

4. **Plans of proposed incinerator:**

   a) Are there a set of plans available for the incinerator? _____

   b) Is a copy of the plans attached to this application? _____

   c) Please provide any additional specifications of the proposed incinerator _____

   _____

5. **Air contaminant control equipment:**

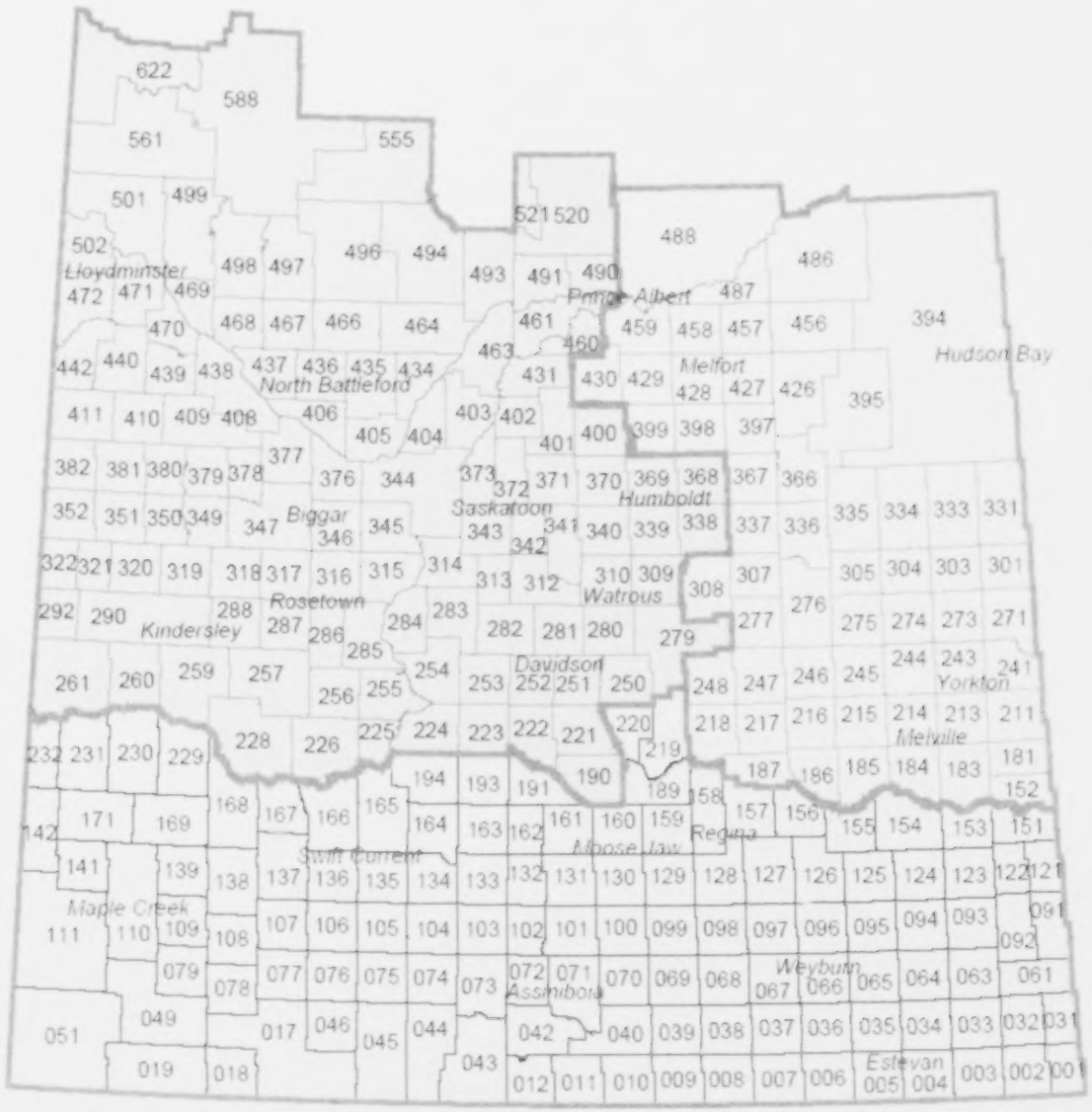
   a) Describe the air contaminant control equipment used on the incinerator _____

   _____

APPENDIX F – DEATH LOSS

Type	Kind of Animal	Weight	Annual Death Loss (%)
Beef Cattle			
	Cows and bulls	550 kg or 1212 lb.	1
	Feeder cattle	450 kg or 992 lb.	1.5
	Replacement heifers	360 kg or 794 lb.	1
	Calves	135 kg or 298 lb.	4
Dairy Cattle			
	Cows and bulls	600 kg or 1323 lb.	4
	Replacement heifers	450 kg or 992 lb.	4
	Calves	135 kg or 298 lb.	8
Hogs			
	Boars or sows	150 kg or 331 lb.	4
	Feeder pigs	100 kg or 220 lb.	3
	Weanling pigs	16 kg or 35 lb.	1.5
Poultry			
	Hens, cockerels, capons	1.8 kg or 4 lb.	6
	Chicks, broilers	1.5 kg or 3.3 lb.	2
	Hen turkeys, geese, ducks	8 kg or 18 lb.	5
	Heavy tom turkeys	12 kg or 26 lb.	7
Sheep			
	Rams or ewes	45 kg or 99 lb.	3
	Lambs	20 kg or 44 lb.	5
Goats			
	Does or bucks	45 kg or 99 lb.	3
	Kids	20 kg or 44 lb.	5
Horses			
	Mares and studs	600 kg or 1323 lb.	1
	Replacements	400 kg or 882 lb.	1
	Colts or ponies	135 kg or 298 lb.	4
Bison			
	Cows or bulls	550 kg or 1212 lb.	0.25
	Calves	135 kg or 298 lb.	1
Elk			
	Cows or bulls	227 kg or 500 lb.	3
	Calves	113 kg or 250 lb.	5
Deer			
	Does or bucks	90 kg or 200 lb.	5
	Fawns	23 kg or 50 lb.	10

Agricultural Operations Regions



Legend

- Ag Ops region boundaries
- Saskatoon Region
- Weyburn Region
- Yorkton Region

Agricultural Operations Regional Offices

Saskatoon:	Ken Mcknight	933-5322
	Wendi Dehod	933-5095
Weyburn:	Randy Vopni	848-2379
	Christopher Pinno	848-2326
Yorkton:	Brian Campbell	786-1505
	Bryan Gourlie	786-1429

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